

Using the EventGenerator

Georgia and Roxanne

Progress...

- * The flux files have been modified so they are “compatible” with EventGenerator (meaning units = $\nu/\text{cm}^2/10^{20}\text{POT}/E(\text{MeV})$)
- * Modify the python script to run only GENIE (removed everything else)
- * Now: Need to understand better what the code does (not easy since there is no documentation (is this true?)). Especially hard to see what GENIE does...

Questions:

- * Does GENIE know which cross-section to use (may be from gdw1 file that tells which target?)
- *

Inputs when using histograms from a flux file

in the .py file:

— used
— may be used?

```
# Maximum number of events to do.  
process.maxEvents = genie.untracked.PSet(  
    input = genie.untracked.int32(1)  
)
```

```
process.geniegen = genie.EDProducer(  
    "GENIEGen",
```

```
    FluxType      =genie.string("histogram"),    #histogram, ntuple, or simplentuple
```

```
    FluxFile      =genie.string("/uboone/app/users/guenette/Flux_files/april07_baseline_rgen610.6_flux_8gev_GENIE.root"),
```

#name of file with flux histos

```
    BeamName      =genie.string("booster"),        #numi or booster at this point - really for bookkeeping
```

```
    TopVolume     =genie.string("volTPC"),        #volume in which to produce interactions
```

```
    TargetA       =genie.double(40.),            #A of target nucleus...on average
```

```
    EventsPerSpill =genie.double(0),             #set != 0 to get n events per spill
```

```
    POTPerSpill   =genie.double(6.e20),          #should be obvious
```

```
    MonoEnergy    =genie.double(2.),            #in GEV
```

```
    BeamCenter    =genie.vdouble(0.25, 0., 0.),  #center of the beam in cm relative to detector coordinate origin, in meters for  
    GENIE
```

```
    BeamDirection =genie.vdouble(0., 0., 1.),    #all in the z direction
```

```
    BeamRadius     =genie.double(3.),            #in meters for GENIE
```

```
    SurroundingMass =genie.double(0.),          #mass surrounding the detector to use
```

```
    GlobalTimeOffset =genie.double(10000.),      #in ns - 10000 means the spill appears 10 us into the readout window
```

```
    RandomTimeOffset =genie.double(10000.),      #length of spill in ns
```

```
    ZCutOff        =genie.double(0.),            #ignore any interactions with z > than this value
```

```
    GenFlavors     =genie.vint32(12, 14, -12, -14), #pdg codes of neutrino flavors to make
```


Questions about the inputs

- When generating events from histos: Do we care about the maximum number of events to generate?
- Or is this a relation between total POT and number of events/POT ?
- Where is duration (or number of spills) of the run defined (in relation to POTperSpill)
- Is the Beam direction/radius included in gdml file? If yes which one over-rule?